

LOON LAKE  
Steuben County  
2009 Fish Management Report

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## EXECUTIVE SUMMARY

- A general fisheries survey was conducted at Loon Lake on May 26 through 29, 2009. Water chemistry and aquatic vegetation data were also collected.
- The Secchi disk reading at Loon Lake during the general survey was 8.5 ft and dissolved oxygen concentrations were not adequate for fish survival below 16 ft. The Secchi disk reading during the plant survey was 8 ft. Submersed vegetation was found to a maximum depth of 13 ft. Eurasian watermilfoil was the most common submersed plant followed by large purple bladderwort, Illinois pondweed, large-leaf pondweed and variable pondweed. A total of 11 species of submersed plants were collected during the survey. Eurasian watermilfoil is classified as an aquatic invasive species in Indiana. One additional aquatic invasive species, curly-leaf pondweed, was observed but not collected during standard sampling.
- A total of 1,009 fish representing 20 species was collected during this survey. Bluegills ranked first by number, followed by spotted gar, redear and largemouth bass. Spotted gar was the dominant species collected by weight followed by bluegills, northern pike and largemouth bass.
- Bluegills and largemouth bass dominated the sport fishery at Loon Lake while redear, yellow perch and black crappies also contributed.
- Age-1 and age-2 bluegills grew at an average rate for northern Indiana natural lakes while age-3 and older fish grew at a below average rate. All ages of largemouth bass grew at an average rate.
- A program for controlling the Eurasian watermilfoil problem at Loon Lake should be implemented in order to allow better boating and fishing access and improve bluegill population size structure.

## TABLE OF CONTENTS

	Page
LIST OF TABLES.....	iii
LIST OF FIGURES.....	iii
INTRODUCTION.....	1
METHODS.....	1
RESULTS.....	2
DISCUSSION.....	4
RECOMMENDATIONS.....	6
LITERATURE CITED.....	6
APPENDIX 1- Survey Data Pages.....	10

## LIST OF TABLES

Table	Page
1. Sampling effort, species composition and relative abundance of fish collected during 1974, 1986 and 2009 fisheries surveys of Loon Lake. ....	7
2. Relative abundance by select size ranges for bluegill and largemouth bass collected during 1974, 1986 and 2009 fisheries surveys of Loon Lake.....	8

## LIST OF FIGURES

Figure	Page
1. Aerial photo of Loon Lake with sample locations.....	9

## INTRODUCTION

Loon Lake is a 138 acre natural lake located approximately 2 miles west of Angola, Indiana in Steuben County. It has an average depth of 4.5 feet and a maximum depth of 18 feet. The lone inlet to Loon Lake is an unnamed creek that originates from Buck Lake and enters the lake on the southeast shore. The outlet is located on the north shore and flows north into Crooked Lake. There is a state owned access site with a concrete boat ramp located at the northeast corner of the lake. This site is accessible off of County Road 100 North. The majority of the shoreline of Loon Lake is undeveloped, consisting primarily of wooded areas. There are only three year-around homes on the lake. The Indiana Department of Natural Resources (IDNR) owns approximately 75% of Loon Lake's shoreline. The IDNR holdings consist of the Anspaugh Wetland Conservation Area, the Loon Lake Nature Preserve and the public access site.

Loon Lake was hydrographically surveyed in 1959 while the initial fisheries survey of the lake was conducted in 1974 by Division of Fish and Wildlife (DFW) biologists. The purpose of this survey was to evaluate the quality of the sport fishery. The major sport species collected included bluegills, black crappies, redear, yellow perch and largemouth bass (Table 1). The Loon Lake fishery was considered satisfactory and no management was recommended. An additional general fish community survey was conducted in 1986.

## METHODS

This survey was conducted from May 26 through 29, 2009 as part of DFW Work Plan 300FW1F10D42621 that covers management of fish populations in natural lakes. Several physical and chemical characteristics of the water were measured in the deepest area of the lake according to the Manual of Fisheries Survey Methods (2001) standard lake survey guidelines. Submersed aquatic vegetation was sampled on July 24, 2009 using methods outlined in the Tier II Aquatic Vegetation Survey Protocol developed by the DFW Lake and River Enhancement Program and used in their aquatic vegetation control grant program. A global positioning system (GPS) device was used to record the location of the limnological data collection site, aquatic vegetation sample sites, and fish collection sites.

Fish were collected by pulsed D.C. electrofishing the shoreline at night with two dippers for 0.75 hours. Two experimental-mesh gill nets and one trap net were fished overnight for three

nights. All fish collected were measured to the nearest 0.1 in TL. Length-frequency tables were constructed for species of concern with whole inch groups consisting of individuals measuring from X.0 to X.4 in TL and half inch groups consisting of individuals measuring from X.5 to X.9 in TL. Length-weight regression equations for Fish Management District 2 were used to estimate the weight of all fish within the sample. Five scale samples per half-inch group were collected from game species for age and growth analysis. Length-at-age for these species was estimated using scale analysis (DeVries and Frie 1996). Age length keys were also constructed to determine mean length at age at the time of collection.

## RESULTS

The Secchi disk reading at Loon Lake was 8.5 ft and dissolved oxygen concentrations were not adequate for fish survival below 16 ft. Fifty sites were randomly sampled during the plant survey, all of which fell within the littoral zone in water 13 ft in depth or less. Plants were collected at 43 of these 50 sites. The Secchi disk reading at the time of plant sampling was 8 ft. A total of 11 species of submersed plants was collected and identified during the survey. Ten of these were native species. The maximum number of plant species found at one site was five and the mean was two. Eurasian watermilfoil was the most common submersed plant followed by large purple bladderwort, Illinois pondweed, large-leaf pondweed and variable pondweed. Seven emergent, floating or floating leaf plants associated with wetlands, arrowhead, cattail, pickerelweed, spatterdock, three square bulrush, watershield and white water lily, were also observed. Eurasian watermilfoil is considered an aquatic invasive species. One additional aquatic invasive species, curly-leaf pondweed, was observed but not collected during standard sampling.

A total of 1,009 fish representing 20 species was collected during this survey. Bluegills ranked first by number (67%), followed by spotted gar (10.5%), redear (5%) and largemouth bass (4%). Spotted gar was the dominant species collected by weight (24%) followed by bluegills (24%), northern pike (33%) and largemouth bass (32%).

Bluegills ranked first by number (67%) and second by weight (24%) among all species collected during the survey. A total of 679 bluegills weighing 59 pounds were captured. They ranged in length from 1.6 (age 1) to 7.2 (age 6) in TL and averaged 4.5 in TL. During electrofishing bluegills were collected at a rate of 759 fish per hour. Trap netting yielded 28

bluegills per lift while 4/lift were collected during gill netting. Bluegills 6.0 in TL or larger, considered harvestable size, only comprised 14% of the sample, reaching this size during their fourth, fifth or sixth year of life. There were no 8 in TL or larger bluegills collected. Age-1 and age-2 bluegills grew at an average rate for northern Indiana natural lakes while age-3 and older fish grew at a below average rate. Harvestable size fish comprised 84% of the bluegill sample in both of the two previous surveys. Very few 8 in TL or larger bluegills were collected in either of these surveys. All ages of bluegills grew at an average rate in 1974. Bluegills younger than age-4 grew at a slightly below average rate in 1986 while older fish exhibited average growth.

A total of 47 redear weighing approximately 32 pounds was collected during the current survey. Redear ranked third numerically (5%) and ranged in length from 4.1 (age 2) to 7.6 (age 5) in TL, averaging 6.2 in TL. Harvestable size redear (6 in TL or larger) comprised 83% the sample. Redear reached this size during their third or fourth year of life. There were no 8 in TL or larger redear collected. All ages of redear grew at an average rate for northern Indiana natural lakes. Electrofishing yielded a catch of 29 redear per hour. Gill netting yielded one fish per lift while 7/lift were caught during trap netting. Redear comprised 4% and 6% of the sample respectively in 1974 and 1986 and only two of these fish were smaller than harvestable size. Only 2 of the 14 redear collected in 1974 measured 8 in TL or larger, while 48 of the 71 collected in 1986 (68%) fell into that size range. In addition, four of the 1986 redear were 10 in TL or larger.

Largemouth bass comprised 4% of the sample by number and 13% by weight, ranking fourth in both categories. They ranged in length from 4.6 (age 1) to 20.3 (age 8) in TL and averaged 10.5 in TL. Bass measuring 14 in TL or larger (legal size) accounted for 13% of the bass collected, reaching this size in their sixth year of life. Electrofishing proved to be the most successful method of capturing bass as 41 fish per hour were collected. There were no bass collected during trap netting efforts while gill nets yielded 1/lift. All ages of bass grew at an average rate for northern Indiana natural lakes. In the two previous Loon Lake surveys bass ranked sixth (4%) and seventh (5%) by number. Only one bass 14 in TL or larger was collected during those two surveys combined, an 18.8 in TL specimen in 1986.

Thirty-one yellow perch were captured during this survey, comprising 3% of the sample by number and 2% by weight. They ranged in length from 5.8 (age 3) to 11.0 (age 9) in TL and averaged 6.5 in TL. Approximately 19% of the perch collected measured 8.0 in TL or larger

which is considered harvestable size. They reached this size during their fifth or sixth year of life. All age groups of yellow perch grew at a below average rate for northern Indiana natural lakes. Perch comprised 19% of the sample in 1974 which made them the second most abundant species collected. They ranked third in abundance during the 1986 survey accounting for 7% of the total fish sample. Harvestable size fish dominated the 1974 and 1986 perch samples comprising 80% and 86% of the collections respectively. Perch from these two surveys grew at an average rate with the exception of age-4 and age-5 fish in 1974 which grew at a below average rate.

Black crappies ranged in length from 5.3 (age 2) to 10.4 (age 4) in TL and averaged 7.9 in TL. A total of 26 crappies weighing approximately 8 pounds were collected. Harvestable size crappies (8.5 in TL or larger) comprised 31% of the sample while 12% were 10.0 in TL or larger. All ages of black crappie grew at an average rate for northern Indiana natural lakes. In 1974 only two black crappies were collected while seven were present in the 1986 fish sample.

One additional sport species was collected during the current survey, northern pike. They ranged from 16.3 to 36.2 in TL and weighed a total of 33 pounds, ranking them third among all species collected by weight. Pike were also present in the previous two surveys with nine collected in 1974 and three in 1986. The largest pike captured during these two surveys collectively was a 35.5 in TL fish.

## DISCUSSION

Loon Lake supports a diverse sport fish community comprised of bluegills, largemouth bass, redear, yellow perch, black crappies and northern pike. Bluegills dominated the survey, comprising 67% of the sample by number and 24% by weight. However, only 13% of these were harvestable size, a low percentage for bluegills. This represents a significant decline considering 84% of the bluegills in the previous surveys were harvestable size. Numerically, age-1 and age-2 fish combined comprised only 19% of the sample while age-3 and age-4 bluegills comprised 63%. Once bluegills reached age-3, growth slowed from average to below average. It appears an over-abundance of age-3 and older fish is impacting growth. Predation is one factor that controls bluegill abundance. There are several species in Loon Lake that prey on bluegills, including largemouth bass, northern pike and spotted gar. In fact, spotted gar ranked number two in species abundance during the current survey, comprising 10.5% of the total fish



sample. In addition, since the last survey in 1986 there has been an explosion in the abundance of Eurasian watermilfoil at Loon Lake. The milfoil, combined with the presence of many other plant species, provides plentiful cover for small fish to hide in, thus making it difficult for predators to successfully capture them. The milfoil also makes it difficult to navigate a boat around the lake and interferes with fishing. This further inhibits the removal of bluegill from the population. This combination of factors could very well be responsible for the presence of more bluegills than the available food supply can support without limiting growth.

Largemouth bass provide good fishing opportunities in Loon Lake. The percentage of harvestable size bass has increased from what was seen in the previous surveys. Bass have traditionally comprised from 3% to 5% of the total fish sample for Loon Lake surveys. Growth continues to be average for natural lakes in Indiana.

There was nothing remarkable about the redear, yellow perch or black crappie populations at Loon Lake. These species do, however, provide additional fishing opportunities for Loon Lake anglers. Redear were the most abundant among these three species and sported the highest percentage of harvestable size fish. However, the number of 8 in TL or larger redear collected represented a steep decline from what was seen in the previous collections. Further, the total number collected also fell 34%. Redear growth was very similar to what had been observed previously. The total number of perch collected was significantly smaller than in the two previous surveys and there was a sharp decline in the percentage of harvestable size perch collected. Crappie numbers, however, showed an increase. Sample size of all three of these species has traditionally been small making it difficult to draw any conclusions in regards to trends in these populations. There was a decrease in sampling effort for the current survey which may account for some of the lower total numbers collected. Since catch by gear type was not kept separately until the current survey, it is impossible to compare catch per effort. The increase in vegetation abundance at Loon Lake may also be negatively impacting fish vulnerability to the gear. Conducting additional fisheries surveys within the next five years would be beneficial in providing additional data for determining if this is a persistent and significant change in the fish community composition.

Aquatic vegetation abundance in Loon Lake, specifically Eurasian watermilfoil, is causing major problems in regards to boating and fishing. As mentioned previously, navigation on the lake is very restricted and the bluegill population may be suffering negative impacts. A

vegetation control program would be beneficial for Loon Lake at this time. However, securing funding for this program would be a challenge. There are very few residents on the lake and the cost per home would be high. Seeking funding for a lake wide control program through the Lake and River Enhancement program (LARE) is an option but would require the formation of a property owners association as none is known to exist at this time. Even then, costs would still be high. The DNR owns a substantial part of the Loon Lake shoreline. State funding of a milfoil control program should also be investigated.

The water quality at Loon Lake is considered good. There were no fish diseases or parasites observed during the survey. Shoreline erosion was minimal.

### RECOMMENDATIONS

- A program for controlling the Eurasian watermilfoil problem at Loon Lake should be implemented in order to allow better boating and fishing access and improve bluegill population size structure.

### LITERATURE CITED

DeVries, D. R. and R.V. Frie. 1996. Determination of Age and Growth. Pages 483-512 *in* B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.

Submitted by: Larry A. Koza, Assistant Fisheries Biologist  
Date: 3/9/10

Approved by: Stuart Shipman  
North Region Fisheries Supervisor  
Date: 6/8/10

Table 1. Sampling effort, species composition and relative abundance of fish collected during the 1974, 1986 and 2009 fisheries surveys of Loon Lake.

Species	1974	1986	2009
Black bullhead		1	
Black crappie	2	7	26
Bluegill	77	676	679
Bowfin	17	33	4
Brook silverside	Common	Common	Common
Brown bullhead	21	15	1
Common carp	2		1
Golden shiner	11	5	5
Green sunfish	1		1
Lake chubsucker	10	12	5
Largemouth bass	17	41	39
Northern pike	9	3	7
Pumpkinseed	7	9	33
Redfin pickerel	1	1	4
Redear	14	71	47
Shortnose gar		1	2
Spotted gar	21	46	106
Warmouth	30	39	11
White sucker	1		1
Yellow bullhead	23	115	6
Yellow perch	63	83	31
Total	327	1,158	1,009
Sampling Effort			
Electrofishing Effort	2.0 h AC	1.0 h DC	0.75 h DC
Gill Net Effort	9 lifts	11 lifts	6 lifts
Trap Net Effort	0 lifts	6 lifts	3 lifts

Table 2. Relative abundance by select size ranges for bluegill and largemouth bass collected during the 1974, 1986 and 2009 fisheries surveys of Loon Lake.

Species	Length Range (TL)	1974	1986	2009
Bluegill	3.0-5.5 in	15	106	535
	6.0-6.5 in	50	284	89
	7.0-7.5 in	10	265	4
	≥ 8.0 in	1	21	0
Largemouth bass	8.0-9.5 in	11	20	8
	10.0-11.5 in	4	12	10
	12.0-13.5 in	0	2	6
	14.0-17.5 in	0	0	3
	≥ 18.0 in	0	1	2



▲ Trap Net

—●●— Gill Net

Figure 1. Aerial photo of Loon Lake with sample locations.

## APPENDIX 1. Survey data pages

# LAKE SURVEY REPORT

Type of Survey
<input type="checkbox"/> Initial Survey
<input checked="" type="checkbox"/> Re-Survey

Lake Name	County	Date of survey (Month, day, year)
Loon	Steuben	May 27-30, 2009
Biologist's name	Date of approval (Month, day, year)	
Larry A. Koza	June 8, 2010	

LOCATION		
Quadrangle Name	Range	Section
Angola West	13E	20 and 21
Township Name	Nearest Town	
37N	Angola, Indiana	

ACCESSIBILITY						
State owned public access site			Privately owned public access site		Other access site	
Located off of County Road 100N			None		None	
Surface acres	Maximum depth	Average depth	Acre feet	Water level	Extreme fluctuations	
138	18	4.6	629	1012.06	None	

INLETS		
Name	Location	Origin
Unnamed	Southeast shore	Buck Lake

OUTLETS			
Name	Location		
Unnamed	Northwest to Crooked Lake		
Water level control			
None			
POOL	ELEVATION (Feet MSL)	ACRES	Bottom type
TOP OF DAM			
TOP OF FLOOD CONTROL POOL			
TOP OF CONSERVATION POOL			
TOP OF MINIMUM POOL			
STREAMBED			
			<input type="checkbox"/> Boulder
			<input type="checkbox"/> Gravel
			<input checked="" type="checkbox"/> Sand
			<input checked="" type="checkbox"/> Muck
			<input type="checkbox"/> Clay
			<input type="checkbox"/> Marl

Watershed use
General farming and residential.
Development of shoreline
5% developed residential.
Previous surveys and investigations
U.S.G.S. Hydrographic Survey in August 1959. IDNR Fisheries Surveys: Peterson, 1974; Ledet, 1986.

SAMPLING EFFORT					
ELECTROFISHING	Day hours		Night hours		Total hours
	0		0.75		0.75
TRAP NETS	Number of traps		Number of Lifts		Total effort
	1		3		3
GILL NETS	Number of nets		Number of Lifts		Total effort
	2		3		6
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

PHYSICAL AND CHEMICAL CHARACTERISTICS							
Color				Turbidity			
Light Green				8 Feet	6 Inches (SECCHI DISK)		
Alkalinity (ppm)*				pH			
	Surface: 103.0	Bottom: 120.1		Surface: 9.2	Bottom: 9.0		
Conductivity:		380 micromhos	Air temperature:		68 °F		
Water chemistry GPS coordinates:							
N 41.65039				W 85.04876			

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)
SURFACE	69.1	9.2	36			72		
2	69.2	9.3	38			74		
4	69.2	9.2	40			76		
6	68.9	9.0	42			78		
8	66.6	10.0	44			80		
10	64.7	10.3	46			82		
12	63.4	9.4	48			84		
14	62.0	8.6	50			86		
16	60.9	3.9	52			88		
18	60.2	0.8	54			90		
20			56			92		
22			58			94		
24			60			96		
26			62			98		
28			64			100		
30			66					
32			68					
34			70					

COMMENTS

\*ppm-parts per million



SPECIES AND RELATIVE ABUNDANCE OF FISHES COLLECTED BY NUMBER AND WEIGHT					
*COMMON NAME OF FISH	NUMBER	PERCENT	LENGTH RANGE (inches)	WEIGHT (pounds)	PERCENT
Bluegill	679	67.3	1.6 - 7.2	59.41	24.1
Spotted gar	106	10.5	15.6 - 29.0	59.53	24.2
Redear	47	4.7	4.1 - 7.6	9.44	3.8
Largemouth bass	39	3.9	4.6 - 20.3	31.88	12.9
Pumpkinseed	33	3.3	3.4 - 6.3	3.52	1.4
Yellow perch	31	3.1	5.8 - 11.4	5.91	2.4
Black crappie	26	2.6	5.3 - 10.4	8.07	3.3
Warmouth	11	1.1	4.1 - 8.3	2.60	1.1
Northern pike	7	0.7	16.3 - 36.2	32.85	13.3
Yellow bullhead	6	0.6	7.4 - 12.5	3.05	1.2
Golden shiner	5	0.5	6.9 - 7.5	0.63	0.3
Lake chubsucker	5	0.5	7.3 - 10.9	1.61	0.7
Bowfin	4	0.4	15.8 - 24.4	12.58	5.1
Redfin pickerel	4	0.4	9.9 - 12.3	1.13	0.5
Shortnose gar	2	0.2	19.8 - 20.6	2.16	0.9
Brown bullhead	1	0.1	11.5	0.73	0.3
Common carp	1	0.1	27.3	8.68	3.5
Green sunfish	1	0.1	7.2	0.21	0.1
White sucker	1	0.1	18.6	2.43	1.0
Brook silverside	common				
Total (20 Species)	1,009			246.42	

\*Common names of fishes recognized by the American Fisheries Society.

\*\*Less than 0.1 percent

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLUEGILL									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5	2	0.3	0.01	1	19.5				
2.0	7	1.0	0.01	1	20.0				
2.5	42	6.2	0.01	1	20.5				
3.0	33	4.9	0.02	1,2	21.0				
3.5	84	12.4	0.04	2,3	21.5				
4.0	114	16.8	0.05	3	22.0				
4.5	133	19.6	0.08	3,4	22.5				
5.0	95	14.0	0.10	4	23.0				
5.5	76	11.2	0.14	4,5,6	23.5				
6.0	58	8.5	0.18	4,5,6	24.0				
6.5	31	4.6	0.22	5,6	24.5				
7.0	4	0.6	0.27	4,5,6	25.0				
7.5					25.5				
8.0					26.0				
8.5					TOTAL	679			
9.0									
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									
ELECTROFISHING CATCH		759 /hr		GILL NET CATCH	4 /lift		TRAP NET CATCH	28 /lift	

AGE-LENGTH KEY FOR BLUEGILL														
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE											
			1	2	3	4	5	6	7	8	9	10	11	12
1.0														
1.5	2	1	2											
2.0	7	2	7											
2.5	42	5	42											
3.0	33	5	13	20										
3.5	84	6		28	56									
4.0	114	4			114									
4.5	133	5			27	106								
5.0	95	5				95								
5.5	76	5				15	61	4						
6.0	58	5				12	46	4						
6.5	31	5					31	5						
7.0	4	3				1	3	2						
Total	679	51	64	48	197	229	141	15						
Mean TL			2.8	3.5	4.2	5.1	6.2							
SE			0.04	0.04	0.02	0.03	0.04							

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF REDEAR									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0	2	4.3	0.06	2	22.0				
4.5					22.5				
5.0	4	8.5	0.10	2,3	23.0				
5.5	2	4.3	0.15	3,4	23.5				
6.0	11	23.4	0.18	3,4	24.0				
6.5	18	38.3	0.22	3,4	24.5				
7.0	9	19.1	0.27	4,5	25.0				
7.5	1	2.1	0.32	5	25.5				
8.0					26.0				
8.5					TOTAL	47			
9.0									
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									
ELECTROFISHING CATCH		29 /hr		GILL NET CATCH	1 /lift		TRAP NET CATCH	7 /lift	

AGE-LENGTH KEY FOR REDEAR														
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE											
			1	2	3	4	5	6	7	8	9	10	11	12
4.0	2	2		2										
4.5														
5.0	4	3		1	3									
5.5	2	2			1	1								
6.0	11	5			2	9								
6.5	18	5			4	14								
7.0	9	4				5	4							
7.5	1	1					1							
Total	47	22		3	10	29	5							
Mean TL				4.7	6.1	6.6	7.3							
SE				0.32	0.21	0.07	0.09							

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF LARGEMOUTH BASS									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0	2	5.1	4.16	9,10
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5	1	2.6	0.05	1	22.5				
5.0					23.0				
5.5					23.5				
6.0					24.0				
6.5					24.5				
7.0	3	7.7	0.19	3,4	25.0				
7.5	6	15.4	0.22	3,4	25.5				
8.0	3	7.7	0.27	3,4	26.0				
8.5	2	5.1	0.31	3	TOTAL	39	100		
9.0	2	5.1	0.39	4					
9.5	1	2.6	0.45	5					
10.0	1	2.6	0.54	5					
10.5	2	5.1	0.62	4,5					
11.0	5	12.8	0.69	5					
11.5	2	5.1	0.80	5					
12.0	1	2.6	0.95	5					
12.5	4	10.3	1.03	5,6					
13.0									
13.5	1	2.6	1.31	6					
14.0									
14.5									
15.0	2	5.1	1.83	6					
15.5									
16.0	1	2.6	2.14	7					
16.5									
17.0									
17.5									
18.0									
18.5									
ELECTROFISHING CATCH		41 /hr		GILL NET CATCH	1 /lift		TRAP NET CATCH	0 /lift	

AGE-LENGTH KEY FOR LARGEMOUTH BASS														
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE											
			1	2	3	4	5	6	7	8	9	10	11	12
4.5	1	1	1											
7.0	3	3		2	1									
7.5	6	6		4	2									
8.0	3	3		1	2									
8.5	2	1		2										
9.0	2	2			2									
9.5	1	1				1								
10.0	1	1				1								
10.5	2	2			1	1								
11.0	5	5				5								
11.5	2	2				2								
12.0	1	1				1								
12.5	4	4				3	1							
13.5	1	1					1							
15.0	2	2					2							
16.0	1	1						1						
20.0	2	2								1	1			
Total	39	38	1	9	8	14	4	1		1	1			
Mean TL			4.8	7.9	8.6	11.5	14.3	16.3		20.3	20.3			
SE				0.19	0.40	0.24	0.61							

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF YELLOW PERCH									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0					23.0				
5.5	3	9.7	0.10	3,4	23.5				
6.0	10	32.3	0.11	3,4,5	24.0				
6.5	7	22.6	0.14	4,5	24.5				
7.0	3	9.7	0.18	4,5	25.0				
7.5	2	6.5	0.22	5	25.5				
8.0	2	6.5	0.28	5,6	26.0				
8.5	1	3.2	0.35	5	TOTAL	31			
9.0	1	3.2	0.43	6					
9.5	1	3.2	0.47	6					
10.0									
10.5									
11.0	1	3.2	0.71	9					
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									
ELECTROFISHING CATCH		5 /hr		GILL NET CATCH	4 /lift		TRAP NET CATCH	0 /lift	



AGE-LENGTH KEY FOR YELLOW PERCH														
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE											
			1	2	3	4	5	6	7	8	9	10	11	12
5.5	3	2			2	1								
6.0	10	5			4	4	2							
6.5	7	5				3	4							
7.0	3	3				1	2							
7.5	2	2					2							
8.0	2	2					1	1						
8.5	1	1					1							
9.0	1	1						1						
9.5	1	1						1						
11.0	1	1									1			
Total	31	23			6	9	12	3			1			
Mean TL					6.1	6.4	7.2	9.1			11.3			
SE					0.10	0.15	0.22	0.44						

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLACK CRAPPIE									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5					20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5					22.5				
5.0	1	3.8	0.08	2	23.0				
5.5					23.5				
6.0	1	3.8	0.11	2	24.0				
6.5	3	11.5	0.16	3	24.5				
7.0	1	3.8	0.21	3	25.0				
7.5	4	15.4	0.25	3,4	25.5				
8.0	8	30.8	0.30	3,4	26.0				
8.5	2	7.7	0.37	4	TOTAL	26			
9.0	2	7.7	0.44	4					
9.5	1	3.8	0.50	4					
10.0	3	11.5	0.58	4					
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									
ELECTROFISHING CATCH		3 /hr		GILL NET CATCH	2 /lift		TRAP NET CATCH	0 /lift	

AGE-LENGTH KEY FOR BLACK CRAPPIE														
LENGTH GROUP (inches)	NUMBER COLLECTED	NUMBER AGED	AGE											
			1	2	3	4	5	6	7	8	9	10	11	12
5.0	1	1		1										
5.5														
6.0	1	1		1										
6.5	3	3			3									
7.0	1	1			1									
7.5	4	3			1	3								
8.0	8	8			1	7								
8.5	2	2				2								
9.0	2	2				2								
9.5	1	1				1								
10.0	3	3				3								
Total	26	25		2	6	18								
Mean TL				5.8	7.3	8.8								
SE				0.50	0.25	0.21								

GPS SAMPLING COORDINATES											
GILL NETS				TRAP NETS				ELECTROFISHING			
1	N	41.53698	W 85.10762	1	N	41.53524	W 85.11123	1	N		W
	N		W	2	N	41.53740	W 85.11348		N		W
2	N	41.53358	W 85.11025	3	N	41.53510	W 85.10471	2	N		W
	N		W	4	N		W		N		W
3	N	41.53600	W 85.10949	5	N		W	3	N		W
	N		W	6	N		W		N		W
4	N	41.53378	W 85.11213	7	N		W	4	N		W
	N		W	8	N		W		N		W
5	N	41.53521	W 85.10593	9	N		W	5	N		W
	N		W	10	N		W		N		W
6	N	41.53826	W 85.11198	11	N		W	6	N		W
	N		W	12	N		W		N		W
7	N	41.53611	W 85.10589	13	N		W	7	N		W
	N		W	14	N		W		N		W
8	N	41.53495	W 85.11133	15	N		W	8	N		W
	N		W	16	N		W		N		W
9	N		W	17	N		W	9	N		W
	N		W	18	N		W		N		W
10	N		W	19	N		W	10	N		W
	N		W	20	N		W		N		W
11	N		W					11	N		W
	N		W						N		W
12	N		W					12	N		W
	N		W						N		W
13	N		W					13	N		W
	N		W						N		W
14	N		W					14	N		W
	N		W						N		W
15	N		W					15	N		W
	N		W						N		W
16	N		W					16	N		W
	N		W						N		W
17	N		W					17	N		W
	N		W						N		W
18	N		W					18	N		W
	N		W						N		W
19	N		W					19	N		W
	N		W						N		W
20	N		W					20	N		W
	N		W						N		W

Occurrence and Abundance of Submersed Aquatic Plants							
County:	Steuben	Total Sites:	50		Mean species/site:	1.64	
Date:	7/24/2009	Sites with plants:	43		SE Mean species/site:	0.18	
Secchi (ft):	8.0	Sites with native plants:	24		Mean native species/site:	0.90	
Maximum Plant Depth (ft):	13.0	Number of species:	11		SE Mean natives/site:	0.16	
Trophic Status:	M	Number of native species:	10		Species diversity:	0.75	
		Maximum species/site:	5		Native species diversity:	0.86	
Species		Frequency of Occurrence	Rake score frequency per species				Plant Dominance
			0	1	3	5	
Eurasian Watermilfoil		74.0	26.0	20.0	8.0	46.0	54.8
Large purple bladderwort		18.0	82.0	18.0	0.0	0.0	3.6
Illinois pondweed		14.0	86.0	12.0	2.0	0.0	3.6
Large-leaf pondweed		14.0	86.0	12.0	2.0	0.0	3.6
Variable pondweed		14.0	86.0	14.0	0.0	0.0	2.8
Floating-leaf pondweed		12.0	88.0	12.0	0.0	0.0	2.4
Elodea		6.0	94.0	6.0	0.0	0.0	1.2
Chara		4.0	96.0	4.0	0.0	0.0	0.8
Slender Naiad		4.0	96.0	4.0	0.0	0.0	0.8
Curly leaf		2.0	98.0	2.0	0.0	0.0	0.4
Ribbon-leaf pondweed		2.0	98.0	2.0	0.0	0.0	0.4
Other species observed: Arrowhead, cattail, curly-leaf pondweed, pickerelweed, spatterdock, three-square bulrush, watershield, white waterlily.							